

The Phoenix Board

The 16 bit Replacement Motherboard for the Amiga TM
20-07-95 Version 1G

Introduction.....	1
Differences for 500 and 2000 Owners.....	1a
Chapter 1.....	2
Features of the Phoenix Board	
Chapter 2	3
Installing the Phoenix Board	
Chapter 3	4
Testing and Problem Solving	
Appendix A	5
Link Configurations	
Appendix B	6
Memory Options	
Appendix C	7
Model Variations	
Appendix D	8
Kickstart ROMs & Swap Switches	
Appendix E	9
Floppy Drive Swap Switch	
Glossary of Terms.....	10
Service Guidelines.....	11
Acknowledgements.....	12

INTRODUCTION

This documentation is organised in the following fashion:

CHAPTER 1 covers the features of the Phoenix Board in detail, including both standard and optional features.

CHAPTER 2 covers the installation of the Phoenix Board. If your Phoenix Board is to be installed by an approved installer, you should be able to disregard this section.

CHAPTER 3 gives some guidelines to testing and trouble-shooting your Phoenix Board. If you did not install the board yourself, you should gather as much information as possible using this chapter before contacting the installer regarding difficulties.

APPENDIX A describes the manner in which the various links on the Phoenix Board should be set for the standard configuration and with each option installed.

APPENDIX B explains the possible memory configurations of the Phoenix Board with either 1MB or 2MB installed on the motherboard.

APPENDIX C lists the variations between Amiga 1000s as regards both installation and operation of the Phoenix Board.

APPENDIX D describes the possible Kickstart choices offered by the Phoenix Board, and how the Kickstart Swap Switch is used to select them.

APPENDIX E describes the installation of a Drive Swap Switch.

Also included in your package are the following items:

- A support disk titled "Phoenix Board" which contains technical documentation too extensive or specific for this manual, as well as useful utilities.
- The Service Guidelines section at the end of this document explains our service procedure and fault liability policy. Please read this carefully before contacting us to report a product fault.
- A small plastic bag containing 5 links, should you misplace any provided with the Phoenix Board or its options.
- Any options kits you purchase with your board with their accompanying documentation, disks and chips, as well as other separate items such as a hard disk.

If anything appears to be missing please contact us for assistance.

We would appreciate feedback on any aspect of this documentation you find lacking - it will continue to improve, but your help will speed the process.

Differences for 500 and 2000 Owners

As the Phoenix Board was designed as a replacement for the A1000 motherboard several connectors are different. See Figure 2-2 for the locations of the principal connectors. The connectors that are different are as follows :-

1. The printer port. DB25 gender reversed. 3 pins swapped in the bottom row. Swap 14 with 23, 15 with 24 and 16 with 25.
2. The serial port. DB25 gender reversed. RS232 pins are OK but other pins are different, do not use a ribbon cable to connect anything as this may put dangerous voltages into your equipment. Use a cable that connects only the pins you need. See page 3 of the A500/A2000 Technical Reference Manual for the differences.
3. The keyboard. 4 pin FCC68 connector. 2000 compatible with adaptor cable. For the 500 an extra connector is provided for the additional 3 wires or an 8 pin FCC68 connector can be fitted in

place of the 4 pin one.

4. The power supply. 7 pin .156" single row. Designated JP1. Pin #1 is the square pad at the front of the board. Voltages are as follows :-

	Pin#	Voltage	Remarks
A1000	1	-5V	If there is no -5v on your supply use -12v but do not use any peripherals that need -5v.
	2	+12V	
	3,4	Ground	
	5,6	+5V	
	7	Tick	This provides a 50Hz "tick signal" to run the CIA Timers more accurately than the vertical sync pulse does on the later Amigas. If you have no tick signal on your power supply (most won't) then you must set L125 (below the Even CIA U62) to the left.

CHAPTER 1

FEATURES OF THE PHOENIX BOARD

Your Phoenix Board is equipped with the following features:

- Full support for the Enhanced Chip Set (Obese Agnus standard)

The Enhanced Chip Set is a new pair of custom chips that Commodore has developed, consisting of new Agnus and Denise chips.

Unlike the old Fat Agnus in early Amiga 500s and 2000s, and the even older 48-pin Agnus in Amiga 1000s, the Obese (or Super) Agnus allows up to 1 megabyte of chip (graphics) memory. The earlier Agnus chips, which allowed only 512k of chip memory, severely limited the number and complexity of graphics operations that were possible. For example, Deluxe Paint's 640x512 16-colour interlaced screen could be used, but there was not enough chip memory left over for the undo feature or the alternate screen.

Other features offered by the Obese Agnus include the ability to do "blits" (the copying or moving of an area of memory by the chip itself) of a much larger size than was previously possible. This means that less time is needed to manipulate large graphic objects, leading to faster operation of some programs.

The Super Denise chip, is pin-compatible with the earlier Denise in the A1000, will offer two new graphics modes in conjunction with the Obese Agnus. The Super-Hires mode produces 1280 pixels across the screen; the Productivity Mode displays 480 lines down the screen without interlacing. A multisync or VGA monitor is required for Productivity mode.

The Super Obese Agnus (2 Meg Chip RAM) is also available and works with the Phoenix Board.

- Kickstart 1.3 ROM

The Phoenix Board comes standard with a Kickstart 1.3 ROM (if fitted); this revision of the operating system is by far the most widely used, and is extremely stable. It differs from 1.2 mainly in that it allows autobooting from hard disks (such as one connected to the Phoenix Board's optional SCSI port) and the RAD: ramdisk. Earlier Kickstart revisions are somewhat unreliable and buggy, and should only be used to run software which fails on later versions.

The Phoenix Board can hold four or more Kickstarts, any two or more of which can be selected with the optional Kickstart Swap Switch. This can include the Version 2.0 ROM or later ROMs. Please see Appendix D for more information regarding Kickstarts.

- Up to 8MB of RAM on the Motherboard (2MB Standard)

The Phoenix Board comes configured for 2 megabytes of RAM on the motherboard, which is normally configured as 1MB chip RAM and 1MB slow RAM. There is provision for up to 8MB on the motherboard when using a 2 Meg AGNUS and 4Mb DRAM chips, 2MB chip and 6 MB slow RAM. However, various memory configurations are possible - please see Appendix B for details.

- Internal Real-Time Clock

The standard A1000 and A500 have no built-in-real-time clock, which means that every time the Amiga is booted the system clock will be set to a random time. The A501 memory board for the A500 does contain a real-time clock, which is accessed via the SetClock program in the startup-sequence. The clock on the Phoenix Board operates in the same manner, and is thus fully compatible with those in the A500 and A2000.

- Software Switching of the 7.5Hz Audio Filter

All model Amigas have a high-frequency audio filter which cuts out sounds above 7.5Hz. the filter in the A1000 is fixed in hardware, and can only be disabled with a hardware modification. The filter in the A500, A2000 and A3000, however, is tied to the power light, and is therefore under software control. When the power light is bright, the filter is switched in, and when the power light is dim, the filter is switched out.

Switching out the audio filter can dramatically improve the sound produced by some programs; many programs in fact switch the filter out themselves. The Phoenix Board has its audio filter tied to the power light in the same manner or manual switching is also possible using an additional toggle switch.

- Internal Disk Drive Connector

The Amiga has the ability to support four floppy disk drives, which can be either 3.5" or 5.25" types. On the A1000 and A500, the connector for DF1 (the second disk drive) is external, and DF2: and DF3: are daisy-chained on to DF1:. On A2000s and A3000s, DF1: is internal, and the external connector is for DF2: and DF3:.

The Phoenix Board has an internal DB23 connector identical to the external drive connector. This will allow your external drives to be mounted internally in a larger case.

- Internal RS-232 Connector

A dual-row header connector (as found in the A2000) allows any standard RS232 device, such as a MIDI interface or modem, can be fitted internally. Note, however, that because this is a duplicate of the A1000 Serial Port pin outs, A2000 Serial Port peripherals will need modification to match them. Contact Sirius Cybernetics for further details.

- B2000 Compatible Expansion Slot

This slot is designed to work with all A2000 expansion cards, many of which offer facilities not available for the A500 and A1000. Link L15* must be removed if a card is installed in this slot; if the card does not work correctly, consult Chapter 3. *See figure 2-4 for location of L15.

- B2000 Compatible Video Slot

The Phoenix Board has an A2000-compatible video connector which accepts a genlock, FlickerFixer™ etc. This slot includes all signals present on the A2000's video slot.

- Fully Compatible Expansion Connector

The Phoenix Board's 86-way expansion edge connector is identical to that of the original A1000 and A500 in function, and is therefore fully compatible with all devices intended for this connector.

Commodore's SideCar IBM-PC emulator will frequently fail to work with the A1000 (and hence the Phoenix Board), especially early Side Cars. Please see Appendix C for more details.

- Monochrome Video Output

The Phoenix Board does not produce the composite colour output of the A1000, but rather a monochrome signal, like the A500 which produces optimum results with a green or amber monochrome monitor. Such monitors produce a sharper image than colour monitors, making them ideal for text-based work.

- Maths Co-Processor Socket

The Phoenix Board has a socket for 68881/68882 Co-Processors. A PAL chip and oscillator crystal are required as well as the 6888x Co-Processor chip.

- Fully Socketed

The Phoenix Board is fully socketed. This means that if at any stage chips need replacing or new chips need to be installed no soldering is required, thus avoiding board and chip damage. All chips are simply plugged in.

- Use of a Larger Case

Some of the above features which allow peripherals to be mounted inside a case containing the Phoenix Board require that the case be larger than the A1000's original case. We intend to market such a case at some time in the future, but for the moment we suggest you purchase an IBM PC-compatible case and alter it to fit the Phoenix Board if you require these facilities.

PHOENIX BOARD OPTIONS

The following optional feature may also be included with your board. If not, they may be ordered separately from us at any time.

- Internal 8 Megabyte Daughterboard AP1001-D

As well as the maximum 2 megabytes on the actual Phoenix Board itself, an internal 8 megabyte daughterboard is available. This board connects to a special socket on the Phoenix Board, and so should not interfere with any other external expansion devices. The board will accept up to 8 megabytes of RAM, and can be populated in 512K/1MB/2MB/4MB/8MB steps.

- Internal SCSI Port Kit AP1001-SC

The SCSI Port Kit consists of several chips (including a custom-programmed PAL and autobooting driver EPROM), a disk containing support software and full documentation. A DB25 SCSI cable extension kit (AP1001-HE) is also available.

An AP1001-BK Mounting kit is required to mount the drive internally. This kit contains Power and Data cables, a Template, and a Mounting Bracket.

- Disk Drive Swap Switch AP1001-DS

5.25" disk drives are an excellent alternative to standard 3.5" drives because of the low cost of disks and greater reliability. The optional disk drive swap switch permits booting from a disk drive other than DF0: e.g. a 5.25" drive. This allows you to store all software on 5.25" disks.

- Kickstart Swap Switch Kit AP1001-KS

Because ROM upgrades change many things in the operating system, there are some (poorly written) programs and games which do not work with more recent versions of Kickstart. It is for this reason that the option exists to have four or more versions of Kickstart present in the Phoenix Board. The Kickstart Swap Switch Kit enables you to select a Kickstart using an external switch. Please see Appendix D for more details.

For convenience we sell the Kickstart Swap Switch Kit, which enables either of two of these Kickstarts to be selected by an external switch mounted on the case.

- Maths Co-Processor Kit AP1001-MS

The 68000 CPU is not optimized for mathematical operations, which are executed more quickly by the 68881 and 68882 co-processors. They operate in parallel with the 68000, handling mathematical operations much faster than the 68000 could. This can produce a significant increase in the speed of maths-oriented applications such as Drawing, CAD packages and Ray Tracing programs, and especially those programs that use trigonometrical functions. However, note that programs must use the IEEE libraries supplied by Commodore, which take advantage of the maths co-processor.

To use the socket you must fit our custom PAL chip, which is provided with additional software support and documentation. The kit we sell can also include (At extra cost), your choice of a 68881 maths co-processor and a 12, 16 or 20 MHz oscillator to suit.

- Pal (Video) Version Cable Set AP1001-PC

Some late model A1000's have their internal disk drive connectors soldered to the main board. This means that they cannot be used with the Phoenix Board. For those people who have this version board, a cable set is available to replace the soldered cables. It is not enough to desolder the cables, as new connectors are required for the cables, in order to work with the Phoenix Board. Do not attempt to use other cables.

CHAPTER 2

INSTALLING THE PHOENIX BOARD

This chapter describes the installation process in complete detail. If you are technically experienced you may not need all of this information, but if you are in any doubt at all as to the correct approach to any part of this process PLEASE READ THE APPROPRIATE SECTION CAREFULLY. If you are

inexperienced with electronic equipment please read this chapter in its entirety before commencing; if you are still unsure of your ability please contact us or one of our approved installers to arrange installation. The installation fee is a small price to pay compared to the possible expense of chip or board damage.

Unpacking the Phoenix Board

Your Phoenix Board comes packed in an anti-static bag which we use to protect the board and its chips from electrostatic damage. Please leave the board in this bag until you are ready to transfer it to the installation environment described below.

The floppy disk contains additional documentation and diagnostic programs for the Phoenix Board, and various utilities that you may find useful. However, all information you need to install the Phoenix Board is contained in this printed document.

If your Phoenix Board is to be installed by an approved Phoenix installer, you may disregard the rest of this chapter. Simply deliver the board (in its anti-static bag) to the installer, along with your Amiga 1000.

Work Area Preparation.

Most of the chips on the Phoenix Board and in your original A1000 or A500 are EASILY DESTROYED BY STATIC ELECTRICITY, which is generated by walking on carpet, the rubbing of clothing etc. Following these guidelines will virtually eliminate the possibility of static damage occurring:

- the best working surfaces are anti-static mats or sheets of conductive foam, but a metal surface, preferably a kitchen sink or solid metal sheet, is a good substitute. If you use a sheet of aluminium foil, take care that fragments of it aren't stuck to or embedded in the pins on the back of the Phoenix Board when you install it.
- If you use a metal work surface, ensure that it is well clear of all mains wiring. Sharp corners can easily puncture wiring insulation.
- Ideally you should attach yourself to your working surface with a conductive wrist strap (available from Tandy Electronics, part no.#276-2397, for about \$5). Otherwise, maintain contact with the work surface, especially while placing or removing a chip from it.
- When chips are not in their sockets place them on the metal sheet. Do not let them come into contact with clothing or plastic.
- If passing a chip or board to someone else, touch his/her skin before handing over the article. This eliminates any relative static charge between you.
- Touch the metal casing of one of the mouse/joystick connectors at the side of the Phoenix Board or original A1000 motherboard before inserting or removing chips.

All these measures are intended to eliminate any static being discharged across the chips and boards you are working with. Nothing as dramatic as a spark is required to destroy or subtly damage chips!

You will need the following tools to carry out the installation process:

- A medium flat-blade screwdriver.
- A medium-sized Phillips head (crosspoint) screwdriver, preferably magnetic.
- A small flat-blade screwdriver.
- A small coin.
- A pair of long-nosed pliers.
- About ten small containers to hold screws and nuts.

- A T10 Torx screwdriver, if working on an A500.

Disassembling the A1000

Disconnect all cables from the A1000 and take it to your prepared work area. Turn the A1000 upside down, with the front facing towards you. Referring to Figure 2-1, remove all seven screws shown and store them in one of the containers. Keep these screws separate from the similar internal ones, which have a coarser thread. Do not be concerned if the material holding the front two countersunk screws is stripped, since these do not play much part in holding the A1000 together.

Turn the A1000 upright again with the front facing towards you. To remove the top cover you must release four plastic catches near each corner of the machine, in the positions shown in Figure 2-2. They are located inside the top cover and are not readily visible from outside. You may be able to see a slight mold mark in the gap between the top and bottom halves at the points where they are located, but this is not important. Place the coin horizontally in the slot between the top and bottom halves at each point and, pushing gently inward, move the outer edge of the coin downwards; this should release the catch. Lift the cover off and put it aside (the signatures embossed on the underside are those of the people who developed the Amiga in 1984!)

Remove the fourteen screws holding down the upper RF shield which covers the motherboard, whose locations are shown in Figure 2-2. There are several different screw types within this group, which should be kept separate:

- Three roundhead 3mm ISO metal thread screws along the power supply;
- A countersunk 3mm ISO metal thread screw at the rear of the disk drive;
- Eight tin-plated "silver" self-tapping screws along the rear edge of the board;
- Two gold (cadmium-plated) self-tapping screws at the front of the board.

Untwist the two Upper RF shield metal tables near the board (shown in Figure 2-2) which hold the upper RF Shield to the motherboard with the long-nosed pliers. Carefully lift the upper RF shield free of the motherboard and put it aside.

At this point the A1000's chips are accessible and subject to static damage. Remember to follow the guidelines previously mentioned while touching or handling them. Remove the plastic cover the from 256K expansion cartridge at the front by squeezing it between two fingers places in the centre of the upper and lower edges and pulling outward. A fair amount of pressure may be required to do this. Remove the two screws at the lower corners of the cartridge's circuit board and remove it from the edge connector on which it is seated. This cartridge **MUST UNDER NO CIRCUMSTANCES BE ATTACHED TO THE PHOENIX BOARD**. Carefully remove the front panel of the Amiga by pulling the top outward and down, allowing the clips that hold it at the bottom to disengage. With the panel now lying face down, carefully unclip the power and disk drive lights (LEDs) from the front panel, taking care not to bend the wires connected to the LEDs near the body of the LED since they tend to snap off easily. Unplug the power LED from the motherboard and put it aside. If the power LED will not unplug and is soldered to the board, consult Appendix C now.

Disconnect the power supply from the motherboard. Note the orientation of the connector, with the grey lead towards the rear of the machine. Also disconnect the power connector and 34-way ribbon cable attached to the internal disk drive from the board (Note - if these cables are soldered to the motherboard in your A1000, please consult Appendix C NOW, as you will need to obtain an AP1001-PC cable kit). The red stripe on the 34-way cable should be on the right hand side; it must be oriented in the same manner when installed in the Phoenix Board.

Unbolt the disk drive, which is held by the four gold self-tapping screws and four slotted brass extension nuts shown in Figure 2-2. Carefully lift the disk drive free of the motherboard. Unclip the earth lead between the disk drive and the motherboard and put the drive assembly aside.

the remaining screws and metal tabs holding the motherboard are now exposed. Remove the two tin-

plated silver self-tapping screws holding the board and the power supply on the left hand side (marked "Power Supply Screws" in Figure 2-2_ and the two gold self-tapping screws near the right hand side of the board beneath where the disk drive was located (marked "Motherboard Screws" in Figure 2-2).

Removing the Integrated Circuits to be Re-Used

There are 5 chips which need to be removed from the original A1000 motherboard and inserted into the Phoenix Board. Each is listed below, along with its part code (printed on the chip) and designation on either type of original motherboard and the Phoenix Board (printed on the board). The NTSC motherboard differs from the PAL version in that it has a large daughterboard in the front left quarter of the board, as shown in Figure 2-3. Remove this daughterboard if it obstructs the removal of any of these ICs. Figure 2-3 also shows the location, orientation and designation of each of the chips to be removed.

Code	Name	NTSC (daughterboard) Designation	PAL (no daughterboard) Designation	Phoenix Board Designation
68000	CPU	U6S	U6U	U1
8520	CIA#1	U6P	U6T	U62
8520	CIA#2	U6N	U6S	U63
8364	PAULA	U4E	U4F	U10
8362	DENISE	U4A	U4A	U9

Remove each chip by the following method. Carefully place the blade of the screwdriver between the chip and it's socket. Gently work the blade underneath the chip keeping the blade as flat as possible. Be careful not to allow the blade to contact the motherboard underneath. the blade should always remain as flat as possible. (See Figure 2-5). Gently rotate the blade from side to side to help lift the pins along each side of the chip, keeping the chip as level as possible. Gradually work the blade to the opposite end of the chip, until it is free of it's socket. Examine them carefully and straighten any bent pins with the pliers, making sure to touch both the chip and the pliers to your work surface first. DO NOT touch the IC pins with your fingers. Put the chips in a safe place on your work surface.

Removing the motherboard

It is now time to remove the original motherboard from the case. If you have any special cards, switches etc. fitted you may need to unplug or remove them to achieve this. The six metal tabs holding the lower RF shield to the underside of the motherboard must be straightened. These are marked "Lower RF Shield Tabs" in Figure 2-2. Lift the right hand side of the motherboard, pushing the right hand side of the case out slightly to free the mouse/joystick connectors. Excessive force should not be required. Continue lifting the right hand side of the board, pulling gently to the right. The back panel of the case should be removed with the board and put aside. Gently separate the lower RF shield and mylar sheet from the board and keep them together.

The metal guard which surrounds the expansion connector should be removed (it is held in place by a nut and bolt at each end) and fastened to the Phoenix Board in the same manner.

Installing the ICs in the Phoenix Board

Please follow the chip handling guidelines near the beginning of this chapter while handling these chips. Make sure that the Board is lying on a flat smooth surface so that it does not flex or bend with the pressure of inserting the chips. Please note; if the pins on the chips do nt align with the socket holes, do not force them, but refer to chapter 3, page 20, for instructions.

Carefully install the chips removed from the old motherboard in the Phoenix Board as shown in Figure 2-4, noting the orientation of each; the semi-circular notch in one end of each chip corresponds to a similar marking in the diagram. Place each chip lightly onto its socket and ensure that all pins are located correctly before applying pressure evenly on both ends of the chip to seat it. Take particular

care with the 68000 CPU, which will require more force due to its larger size. Once the chips are seated, check again for bent or damaged pins.

Case Preparation

Before installing the Phoenix Board into the waiting case, perform any case modifications relating to options, such as drilling holes for Kickstart & Drive Swap Switches (as well as any other switches you intend to install) and modifying the upper RF shield to accommodate an internal hard disk. Perform these modifications away from the Phoenix Board work area to avoid contamination or damage to the board. If you mount these switches underneath the front expansion connector panel do so along the top right hand corner, to avoid interference with cards intended for this connector which we may produce in the future, and the RF shield.

Clean the inside of the case thoroughly to remove plastic and metal fragments. You are now ready to install the Phoenix Board!

Installing the Phoenix Board

The Phoenix Board is a direct replacement for the original A1000 motherboard.

- 1 Tie or cello tape back the power supply cable out of the way of the board.
- 2 Place the lower RF shield on the underside of the Phoenix Board, making sure that the thin mylar sheet is between them. If this sheet is missing or damaged DO NOT INSTALL the lower RF shield as SHORT CIRCUIT DESTRUCTION of the power supply or motherboard will certainly result.
- 3 Check the alignment of the mylar sheet with the holes in the circuit board and twist the six metal tabs that hold the lower RF shield to the board. DO NOT twist the two tabs at the rear which also engage the upper RF shield at this point. Read "Initial Testing" (page 16) before replacing the UPPER RF Shield.
- 4 Rub the 84 way edge connector very lightly on both sides with a lint-free tissue or cotton bud dampened with alcohol or methylated spirits to clean it. The expansion connector is prone to making unreliable contact with plug-in boards if it has been contaminated by residues from skin contact or dust.
- 5 Put the back panel onto the board making sure all connectors are fully engaged in their appropriate places. Carefully lower the board and back panel over the mounting posts, making sure that the connectors remain fully engaged, and the back panel slides into its slots at both ends. Make sure that the power supply mounting tabs are below the board, and that no wiring is trapped beneath the board.
- 6 At this point the case prevents the mouse and joystick connectors from sitting in their correct position; carefully ease the case out, at the front right corner, to allow them to slip into the holes in the case.

Reassembling the computer

Reassembly is a reversal of the disassembly process. Refer to Figure 2-4 for the location of the connectors described here.

Bolt the board to the case and power supply using the 2 silver PK screws for the "power supply" and the 2 gold PK screws at the location marked "motherboard screws" in Figure 2-2. Next bolt the disk drive to the board with the four gold PK screws and four slotted brass extension nuts. Connect its 34-way ribbon cable to the "Internal Floppy" connector (JP7) near the rear of the board and its 4-way power cable to one of the "Internal Power" connectors (JP2 or JP3) near the centre of the board. In both cases, the red wire should be on the right-hand side.

Plug the power LED into the "Power LED" connector (LED1) near the front left corner of the board; the red wire should be on the right-hand side (See Figure 2-4).

Reconnect the power supply to the Phoenix Board, checking the orientation of the connector. Make sure the locking ridge on the power supply connector faces away from the power supply, and is pushed fully home past the nylon clip. Clip the power and disk drive LEDs to the front panel and replace it, checking that its tabs mate securely with the underside of the case. **DO NOT INSERT THE 256K RAM EXPANSION CARTRIDGE**, as it will short circuit the Board!

Initial Testing

Your Phoenix Board is now ready to run, but before replacing the RF shield and top cover you should reconnect all your peripherals, boot it up and make sure all is well. Run some of your applications and/or games and experiment with the switches. If you have a hard disk connect it and format it, following the instructions in the accompanying documentation. If you experience problems or wish to test the board thoroughly read the next chapter; please attempt to locate and isolate problems yourself before contacting us.

Before permanently replacing the upper RF shield, apply the supplied self-adhesive tape to the shaded areas shown in Figure 2-6. The tape should be wrapped around the shielding as shown so that there is an even amount of tape on the inside and outside of the shielding. This will stop the shielding from shorting to the top of the Phoenix Board. When you are satisfied that the entire system is functioning correctly, twist the two rear metal tabs and replace the fourteen screws. (See Figure 2-2 & page 9 for locations and descriptions. Make sure you use the correct self-tapping type for those on the motherboard; those along the rear of the board are silver (tin-plated) and slightly longer. Make sure that the RF shield is well clear of any switches you may have installed. Clip the top cover back on, and turn the computer over. Replace the five large recessed and two small countersunk screws.

CHAPTER 3

TESTING AND PROBLEM-SOLVING

We hope that your Phoenix Board worked correctly in every respect when you first booted it, and that you're only reading this chapter with the intention of fully testing the board! If, however, the board fails to boot or behaves

incorrectly in some fashion, don't panic; since your board was heavily tested before being shipped, virtually all problems can be traced to damage during shipping and installation.

Testing

The two programs we use to test the Phoenix Board in-house are included on the supplied disk, along with some documentation describing their use and features. Systest tests most of the general functions of an Amiga, while

PBtest, which was written specifically to test the Phoenix Board, covers some different areas. Be aware that many of PBtest's results vary depending on the options installed on your board.

Visual Inspection

If your Phoenix Board fails to boot or crashes repeatedly without obvious cause, you should first check the condition of the board. Shipping can dislodge chips and connectors and cause floppy drive misalignment. Ensure that all chips are firmly seated in their sockets, and carefully check the five chips transferred from the old motherboard for bent or damaged pins or incorrect orientation. If in doubt, remove the chip and re-install it, observing the static precautions described in Chapter 2.

However, a reversed chip will in all likelihood have been destroyed by the application of power. All front-rear oriented chips should have their notches to the rear, and all left-right oriented chips should have their notches to the right.

Check that all internal connectors such as the floppy drive and hard disk ribbon cables and power cables are seated securely and oriented correctly. Check for broken or cracked components, particularly SIP resistor packs (thin single-row packages up to an inch long, of various colours). Check that all jumpers are seated securely, but **DO NOT MOVE ANY OF THEM**. If any jumpers are loose in the packaging or are not firmly seated, carefully check the board against the link configuration detailed in Appendix A.

The expansion connector is prone to making unreliable contact with plug-in boards if it has been contaminated by residues from skin contact or dust. Rub it very lightly on both sides with a lint-free tissue or cotton bud dampened with alcohol or methylated spirits to clean it.

Operational Faults

If your Phoenix Board runs but fails to perform correctly in some respect, you should ensure that the problem cannot be solved by inspection, as described above, before noting precise details of the fault and contacting your installer. as a general rule, try to substitute a similar Amiga (same Kickstart, memory configuration etc. for yours to isolate the fault. Also remove all other expansion boards, background programs etc. when trying to isolate a single faulty hardware or software item. Here are some of the more common failures:

- Floppy drive(s) behaves erratically

If you shipped or transported your Amiga to your installer, it is possible that the internal drive has become misaligned, making it difficult for the drive to read your disks. If formatting and then writing and reading a new disk is unsuccessful, however, this is in all likelihood the problem.

It is also possible, though much less likely, that one of the CIA chips in your Phoenix Board was damaged during the transition to the Phoenix Board

- A peripheral fails to work correctly

Apart from the expansion connector, discussed above, any external connector can fail if its pins are bent or dirty. It is also possible that the chips connected to a given port were damaged by static when a connection was made.

NEVER CONNECT OR DISCONNECT ANYTHING FROM THE AMIGA WHEN SWITCHED ON.
Check the peripheral on another Amiga if possible.

Due to design limitations of the original A1000, attaching two or more peripherals to the expansion connector may cause the Phoenix Board or your peripheral to fail or behave erratically due to the load placed on it. Although it is designed to perform better than the original A1000 in this respect we cannot guarantee this, particularly where the SideCar is used. Please contact us if you are having difficulties - in particular, we can upgrade early SideCars to operate more reliably (see Appendix C).

- Software fails to run or crashes

If you have been using an early version of Kickstart (1.1. or 1.2) some of your software may fail under 1.3, which is supplied with the Phoenix Board. This applies particularly to games. If you really must run such software, the Kickstart in question can be programmed into an EPROM for installation in 1 of the 4 Kickstart ROM socket positions on the Phoenix Board.

Some software is also affected by the presence of the Obese Agnus, which differs from the old A1000 Agnus in several subtle ways, as well as supporting 1MB of chip RAM. Run the software on a A2000

or A500 with an Obese Agnus and 1MB of chip RAM to ascertain whether this is in fact the problem.

Appendix B discusses the various possible memory configurations of the Phoenix Board more fully.

- Sounds seem slightly different

Because the audio filter in the Phoenix Board is software-switchable, many games and audio sampling programs which turn off the filter will sound much clearer than with your old A1000, whose filter could not be disabled. The filter is disabled when the Power LED is dim.

- Phoenix Board will not boot with Kickstart 1.2 or earlier

This problem is usually caused by the SCSI port - if this is not installed in your Phoenix Board, look elsewhere.

Your SCSI hard disk will autoboot under Kickstart 1.3 (and 2.0, when available), but not 1.2 or 1.1. Under 1.2 you must boot from floppy and mount the hard disk through the startup-sequence. The hard disk drive software will not work under 1.1.

- Phoenix Board fails with A2000 card installed

As stated in Chapter 1, virtually all standard A2000 cards will operate correctly in a Phoenix Board with link L15 removed and a our custom PAL fitted. However, if you have a non standard board that will not work, contact Sirius Cybernetics for technical advice.

The second potential problem concerns not the A2000 socket itself, but boards that do not autoconfigure. If this is the problem replace link L15 and try again. If it still fails to work, contact Sirius Cybernetics for technical advice.

- Pins do not align with the socket holes

If the pins on your chips are splayed out and do not align with both sets of socket holes, try the following. Hold the chip firmly at both ends with a finger and thumb and place it on it's side on a flat antistatic surface.

Gently roll the chip until the pins come into contact with the flat surface and apply pressure until the pins bend inward a fraction. NEVER USE EXCESS FORCE. Check the pins alignment with the socket, and repeat if necessary.

If you still need help

If you've followed the above suggestions and still feel that your Phoenix Board has a fault, please read Service Guidelines at the end of this document, which explains the procedure for obtaining service from us and the conditions under which we accept liability for faults.

APPENDIX A - LINK CONFIGURATIONS

This appendix describes the positions of the Links in a standard Phoenix Board (no options installed), and goes on to details the changes relevant to the board's various options.

There are three different kinds of link on the Phoenix Board:

- The two-pin link, which is simply in (link present) or out (link not present);
- The three-pin link, which can be either left, right or out for a left-right oriented link, or rear, front or out for a front-back oriented link.
- The link block, which consists of two or more two-pin links side by side. For 2x2 blocks the orientation of the links is given; for larger blocks (e.g. 3x2, 4x2), the links are oriented perpendicular to the block

itself.

Standard Phoenix Board Links - no options

In each list, the links are listed in rough back-to-front left-to-right order. Links not listed are out.

Two-pin links:

- links R88, L126, R42, L103, L2, L15, L16, L1, L43, L133, L105, L3, L106, L46, L60, L47, L48, L14, L24, L31, L44, L12, L13, L45 in

Three-pin links:

- links L25, rear, *L125, L4 right, L11 left, L40 front.

Link blocks:

- links JP8 all four in, L117 all three in, L119 all four in, L132 right

*L125 is a special case. It is the feed for the internal "jiffy" time and date clock. Set to the left it is fed from the 50Mhz main "tick" from the PSU. Set to the right it is fed from the 50Mhz vertical sync. The former is more accurate but the latter allows the use of IBM type PSU's or batteries.

Options Link and Chip Changes

Each Phoenix Board option which affects the chips or links on the board is listed here, along with those changes:

SCSI Port

- chips U27, U23, U25, J26, U30, *U31, U24 added
- link L14 out

*If U31 is a 27C64 EPROM then add - L3 front, L32 front, L35 right

*If U31 is a 27C512 EPROM then add - L32 front, L31, L35 right (L35 can have a Kickstart switch fitted, see Appendix D for details).

Second Megabyte of RAM

- chips U60, U43-U50 added
- links L47, L48 out, L119 all four out, L56 left
- link L55 right gives second MB at \$C00000 (normal configuration)
- link L55 left gives second MB at \$100000 (for A-Max)

Kickstart Swap Switch Kit

- chip U59 added + Kickstart ROM/EPROM to suit.
- link L60 out
- links L45 in, L46 in, L41 right, L57 left, L58 right

Maths Co-Processor Kit

- socket U20, U21, (plus OSC2 and Co-Processor if ordered_.

Amiga 2000 Socket (with card installed)

- chip U70, L15 usually out (see Chapter 3)
- link L117 all three out

8Meg Daughterboard

- If 8Meg daughterboard is in position
- link L16 out

These link specifications are subject to change as aspects of the Phoenix Board are altered or upgraded.

APPENDIX B - MEMORY OPTIONS

This appendix describes the various possible memory configurations of the Phoenix Board, but much of this discussion also applies to all other Amigas. Although a technically daunting area for some, a significant portion of the software available for the Amiga will run with difficulty (or not at all) under some of these conditions.

Background

The Amiga's operating system (OS) divides installed memory into two types, which are used differently:

- CHIP memory is so called because it can be directly accessed by the Amiga's custom chips (Agnus, Denise and Paula) as well as the CPU. Because the OS relies on these chips to manipulate graphics and sound on the Amiga, this is the only type of memory which can hold graphical data to be displayed and audio data to be heard. The Amiga must have chip RAM to function, since even the initial Workbench screen is allocated from chip RAM.

- FAST memory is only accessible to the processor, and therefore cannot be used to display graphics and play sound. It is used to hold the ramdisk, program code and to store graphic and audio data.

Because most Amiga programs make extensive use of graphic and/or audio, chip RAM is a precious resource. If the OS wishes to load program code or data suited to fast RAM and none is present, it will use chip RAM instead. It is therefore advisable to maintain a reasonable proportion of fast to chip RAM to obtain the best performance from the Amiga: twice as much fast as chip RAM is typical.

The Story of Agnus

The Amiga's chip RAM is addressed (or controlled) by the Agnus chip, which in many ways is the heart of the Amiga. The maximum amount of chip RAM supported by Agnus has increased over the years, in this way:

- 1985: A1000 released - Agnus (48 pin DIP) supports 512KB chip RAM
- 1987: A500 released - Fat Agnus (84 pin DIP) supports 512KB chip RAM
- 1989: Obese Agnus (84 pin PLCC) for A500/A2000 released - supports 1MB chip RAM
- 1991: Super Obese Agnus (84 pin PLCC) released (initially only in A3000) - supports 2MB chip RAM

With each Agnus revision (except Fat Agnus) possible chip RAM has doubled, improving the Amiga's graphics and sound potential and making multitasking more effective. The Phoenix Board uses the Obese Agnus, but will accept the Super Obese Agnus which is also available.

The Phoenix Board

The Phoenix Board comes with the Obese Agnus and 1MB of memory standard, which is all configured as chip RAM. However, changing links will produce 512K chip / 512K fast and 512K chip / no fast configurations. The second megabyte of RAM is normally fast RAM, but once again this configuration can be changed with links. The currently supported configurations are theses:

Installed	chip RAM	fast RAM	L55	L56	L4
-----------	----------	----------	-----	-----	----

@	1MB	1MB	OK	out	out	right
	1MB	512KB	512KB	out	right	left
	1MB	512KB	OK	out	out	left
	2MB	2MB*	OK	left	left	right
@	2MB	1MB	1MB	right	left	right
	2MB	1MB	OK	both	left	right

@ Most common configurations

* Gives 2MB of contiguous RAM, from address 0. Although the OS configures it all as chip RAM, the Amiga will crash when the Obese Agnus attempts to address the second megabyte; the Super Obese Agnus will address this memory correctly. This memory configuration is currently desirable for use with the A-Max™ Macintosh Emulator.

With 2MB installed up to eight configurations are possible, some of which will be supported in the near future. If you have any specific requirements please let us know.

How this affects you

Although this configuration flexibility might seem unnecessary, it allows us to support the Super Obese Agnus and provide for software which does not run with certain configurations. The most common cases are:

- Won't run with fast memory

Some software assumes that all system memory is of the chip type, and therefore doesn't specifically request chip memory when allocating memory for itself. The effects range from graphics appearing as rubbish on-screen to complete crashes. Much software written on early 512K 1000s has this problem. Fix: use one of the OK fast RAM modes.

- Won't run with more than 512K chip RAM

The causes of this are more subtle, and often have to do with differences between the Fat and Obese Agnuses other than chip RAM support. Switching to a 512K chip RAM mode may not cure your problem - you may need to install a Fat Agnus in the Phoenix Board, which of course prevents you from using more than 512K chip RAM.

APPENDIX C - MODEL VARIATIONS

This appendix describes variations between production batches of A1000s and related peripherals which may affect the installation process or operation of the machine. The differences between PAL and NTSC A1000s are covered in Chapter 2 and hence not here.

- Soldered Connections (Installation)

Some late-model PAL A1000s have the internal floppy drive's 34-way ribbon and 4-pin power connectors and the power LED soldered directly into the board rather than connected via IDC connectors. Since these cables are required by the Phoenix Board, we suggest two solutions:

- The more technically expert could remove and trim back the cables and fasten the appropriate connectors to each cable; but it is not advised.

- We sell a kit (AP1001-PC) consisting of these three cables, making it unnecessary to remove these cables from the old motherboard. Please contact us for price and delivery.

- Extra-Half-Brite Video Mode (Operation)

Early NTSC A1000s have a Denise chip which does not support the Extra-Half-Brite video mode. This six-bitplane mode produces 64 colours, the upper 32 of which are merely half-brightness versions of the lower 32. Denise chips which do not support this mode are labelled "r5" or earlier. We suggest that you wait for the Super Denise (see Chapter 1) to become available rather than purchase a late-revision current Denise chip at this time.

The program halfbrite on Fish Disk#1 will display a half-brite pattern; Deluxe Paint III™ also supports halfbrite mode.

- The SideCar PC Emulator (operation)

The SideCar is a complete PC which communicates with the Amiga via a block of shared memory. It will fail or run erratically if the Amiga's bus timing is even marginally worse than spec. Also, inserting other devices (e.g. a memory board) between it and the A1000 is often not possible. However, we can modify early SideCars (which frequently will not run with some A1000s at all) with the changes found in later SideCars, making them more reliable. We must stress, though, that we cannot guarantee the effectiveness of this modification in every case.

Late model SideCars are distinguished from earlier ones by the presence of several SIP resistor packs, which can be seen edge-on if you look at the underside of the board through the edge connector socket.

APPENDIX D

KICKSTART ROMS AND SWAP SWITCHES

This appendix describes the various ways in which the four "ROM positions" available on the Phoenix Board may be used to make four or more different Kickstart (Operating system) revisions available, and the use of the Kickstart Swap Switch (KSSW) to switch between them. The ROM locations are shown in Figure 2-4.

The Phoenix Board has been designed to accept a wide range of ROM and EPROM devices, some of which have greater capacity than is needed by Kickstart 1.3, the current revision of the earlier revisions before exploring other possibilities.

The important distinction between ROMs and EPROMs, for the purpose of this discussion, is that Kickstart ROMs are created by Commodore and thus contain standard Kickstart revisions, whereas EPROMs are created by us (or possibly yourself, if you have access to an EPROM programmer) and can therefore contain any possible Kickstart, either standard or modified (e.g. Guardian virus killer installed).

Common Options

The Phoenix Board comes standard with a Kickstart 1.3 ROM (if fitted) supplied to us by Commodore, located in ROM position 1 (ROM#1 - U53 on the board). The majority of software runs without problems with this Kickstart, but some requires an earlier revision, either 1.2 or even 1.1 (Revision 1.0 had very limited release and can be ignored).

Kickstart 1.2 ROMs are also manufactured by Commodore and sold by us, and should be located in ROM position 2 (ROM#2-U54) if used. A Version 2.0 ROM or later can also be used here.

The third option of interest to many users is the use of four EPROMs in ROM#3 (U55-U58), which together contain a complete Kickstart. We can copy any disk-loaded Kickstart you give us, standard or modified, into these EPROMs for use on the Phoenix Board. Please contact us for price and turnaround time.

ROM#4 is intended for a 2 megabit EPROM, which is a very expensive device at this time and not of interest to most users. It is, however, included in Device Support Details.

Your SCSI hard disk will autoboot under Kickstart 1.3 (and 2.0, when available), but not 1.2 or 1.1. Under 1.2 you must boot from floppy and mount the hard disk through the startup-sequence. The hard disk drive software will not work under 1.1.

Kit Installation

Unless you ordered the KSSW with your Phoenix Board you will need to install the supplied PAL (labelled P59A) in socket U59, which is located directly in front of the metal-cased oscillator OSC1. With the power off, orient the chip such that the notch at one end is on the right hand side when viewed from the front, and check that all pins are straight and correctly located before pushing the chip into the socket. Once the chip is seated, check again for bent or damaged leads.

Link L60 must be removed when this PAL is fitted, links L45 & L46 should be in, L41 & L58 should be right, and L57 should be left. Conversely, if the PAL is removed the entire process should be reversed. Ensure that it is set correctly before applying power to the Amiga.

The Kickstart Swap Switch

The Kickstart Swap Switch supplied with the kit is a two-position switch which allows you to switch between most combinations of two ROM positions from the four available. The two-pin socket on the short lead is connected (with the silver side to the left, see Figure D-1) to link L42, located immediately to the left of U59. The longer single lead is connected to L35 right, with the silver side to the left. If there is a shunt already on L35, this must be removed first. The supplied shunt may be required across the other two pins of L42. The possible configurations are shown in Figure D-1. The location of L42 is indicated on Figure 2-4.

If you need access to three different Kickstarts, it is possible to use a 3-position centre-off toggle switch to select between ROM#1, #2 and #3. Figure D-2 shows how to wire and connect such a switch. See Chapter 2, page 13, "Case Preparation" for locations for switches.

Switching between Kickstarts

Because the Amiga is continuously running Kickstart code (except while running some games which take over the machine completely), changing Kickstarts at any time WILL LOCK UP OR CRASH THE AMIGA. Switching back will have no effect. Rebooting (ctrl A-A) will usually cause the Phoenix Board to run the newly selected Kickstart correctly, but if it crashes while booting you should turn off the power for several seconds and switch it back on. Switching between Kickstarts is only problem-free when done while the power is off.

Device Support Details

This section describes the devices which are supported by the Phoenix Board's four ROM positions and the link changes and/or modifications required to use them.

ROM#1 (U53) and ROM#2 (U54):

A 40-pin ROM of 256KB (V1.3 and earlier) or 512KB (V2.0 and later) supplied by Commodore. Currently available parts are 315093-01 (Kickstart 1.2) and 315093-02 (Kickstart 1.3). Kickstart 2.0 will soon become available, and may be obtained from us at that time. No link changes or modifications will be required to use it. These sockets must NOT be used with 40-pin EPROMS, for which ROM#4 (U61) is provided.

Links and locations for using 27512/27C512 EPROMs in locations U55, U56, U57 and U58

Relevant Links: L41, L57, L58, L59 and L46 - These link locations are indicated on figure 2.4

L46 join 1 & 2

L41 joins 2 & 3 to provide VCC on pin 30 "VCC"

L47 join 1 & 2 to provide A15 on pin 29 "A14"

L58 join 1 & 2 to provide A16 on pin 3 "A15"

L59 plays no part in this process

ROM #3 (U55-U58):

Four 32-pin ROM/EPROM sockets which are superset (enhanced version) of the four 28-pin sockets on the original A1000 motherboard.

They will accept the 8-bit 27C512 EPROM used in our A1000 Kickstart-in-ROM kits as well as larger 8-bit EPROMs up to the 27C080 (an 8 megabit device, sixteen times larger than the A1000 EPROMs. It is also possible with some board mods to fit battery backed static RAMS to these sockets.

Because these are 8-bit EPROMs, they must be used in pairs to emulate a 16-bit Kickstart ROM.

U55 is upper 8 bits of Data Bus and 1st ROM

Even 1st or U5N on A1000 NTSC or U5N on A1000 PAL

U56 is upper 8 bits of Data Bus and 2nd ROM

Even 2nd or U2N on A1000 NTSC or U5R on A1000 PAL

U57 is lower 8 bits of Data Bus and 1st ROM

Odd 1st or U5P on A1-000 NTSC or U5S on A1000 PAL

U58 is lower 8 bits of Data Bus and 2nd ROM

Odd 2nd or U2P on A1000 NTSC or U5T on A1000 PAL

This is a complete list of the devices which may be used:

Part No.	Size	# of pins	Availability	Cost
27C512	512K bit	28	now	economic
27C010	1 Megabit	32	now	economic
27C020	2 Megabit	32	now	economic
27C040	4 Megabit	32	now	high
27C080	8 Megabit	32	now	high

Equivalent non-CMOS parts may also be used e.g. 27512.256 bit and 1 Megabit SRAMS may also be fitted.

Figure D-3

LINKS FOR ROM #3

ROM #4 (U61):

A 40-pin EPROM socket able to accept 16-bit EPROMS from 128KByte up to 1MByte; intended for custom Kickstarts.

This socket must NOT be used with a 40-pin ROM, for which ROM#1 and ROM#2 are provided.

This is a complete list of the devices which may be used:

Part No.	Size	# or pins	Availability	Cost
27C210	1 megabit	40	now	economic
27C220	2 Megabit	40	now	economic
27C240	4 Megabit	40	now	high
27C280	8 Megabit	40	now	high

Equivalent non-CMOS parts may be used.

APPENDIX E

PHOENIX DRIVE SWAP SWITCH

If you are swapping drives other than DFO:, disregard the rest of this paragraph. As there is no drive identification circuitry on the internal drive, if the Amiga is powered up or reset with the switch in the changeover position, it is unable to identify the internal drive as DF1:, DF2: or DF3:. In a two drive system this effectively creates a single drive system without having to physically switch off the internal drive. To use both drives, power on or reset (Control Amiga Amiga) with the switch in the normal position and then switch it over when the Hand-and Disk requester appears on the screen.

The switch can be changed over at any time although preferably not with disks in the drives as this will confuse your Amiga and may result in read/write errors and/or corrupted disks.

Installation

These instructions are written for someone with reasonable experience with electronic equipment. If you are a novice we recommend that you get a technically qualified person to install this modification. We do not accept any responsibility for your (mis)application of these instructions.

If your A1000 is already open with the RF shield removed, disregard the next two paragraphs.

Place your Amiga upside down on a flat nonscratch surface. Using a suitable screwdriver remove the 5 screws holding the two halves of the case together. (see Figure 2-1). While holding the two halves of the case together turn it over. The halves are held together with four plastic clips. These must be prized gently apart by using a small coin or similar.

Once the top has been removed to a safe place, the metal RF shield must be removed. The RF shield is held down by 14 screws and two twist tabs on the A1000. (see Figure 2-2, and list of screws on page 9).

The drive swap switch is fitted to connector JP8 (see Figure 2-4), an eight pin connector which is located next to the left hand end of the 34 way connector for the internal disk drive.

TO DRIVES

FIGURE D-4

LINK BLOCK JP8

It will be seen that if the four standard shunt blocks are installed on the JP8 the drives will be configured as for a standard machine. By removing the 2 shunts from the positions of the drives that you wish to swap and installing the two 2 pin connectors from the drive swap switch in their positions, those two drives will be the ones swapped by the switch. The painted polarizing marks on the 2 pin connectors should both face toward the front of the A1000.

Drill a 1/4" (6.5mm) hole to mount the switch. Above the keyboard connector on the back panel, or inside the empty 256K RAM expansion cover are two convenient locations. Other locations may be used but pay attention to drives, RF shields etc. which may interfere. Please refer to chapter 2, page 13, "Case Preparation" for locations for switches.

Reverse the order of disassembly. Do not leave out the RF shield as this will not improve the cooling of the machine and may cause interference to TV, Radio and Amateur Radio Equipment. This is also known to cause various types of interference to DigiView.

GLOSSARY OF TERMS

Boot - Restart a computer system, either by turning on the power (cold boot) or resetting it on the Amiga keyboard (Ctrl-A-A on the Amiga) (warm boot).

Chip RAM - Memory that is on the graphics (chip) data bus, not the 68xxx processor bus. Therefore it is slowed by the Agnus "stealing" time from the 68xxx in certain hi-res graphic modes. It is accessible by the graphics processor and therefore can be used to establish screens and windows etc.

CIA - Complex Interface Adapter. A chip designed by Commodore which provides various useful functions, including two 8-bit parallel ports, serial ports and accurate timers.

Config - refers to auto-configuration, the process by which the Amiga places its peripherals in its memory map at boot time to avoid conflicts between them. The "Config" signal is passed by each peripheral to the next in a controlled fashion so that each is programmed to appear at the correct memory location in turn.

CPU - Central Processing Unit (A68000 on the A1000). The "brain" of a computer, which actually executes the programs run on the computer.

DIP - Dual Inline Package.

EPROM - Erasable Programmable Read-Only Memory. A memory chip whose contents can be erased and re-programmed by prolonged exposure to ultra-violet light.

Expansion Connector - The 86 way card edge connector on the right side of the A1000.

Fast RAM - Memory that is attached to the 68xxx processor bus, not the chip ram (graphics) bus. Therefore it is not slowed by the Agnus "stealing" time from the 68xxx in certain hi-res graphic modes.

IEEE Maths Libraries - Institute of Electrical and Electronic Engineers - who are responsible for establishing standards. A standard format for floating-point (non-integer) numbers allowing a very wide range of magnitude and precision. Commodore's disk-based maths libraries beginning with "ieee" use this format, as do the 68881 and 68882 maths co-processor chips.

IDC - Insulation Displacement Connector. A plastic connector designed to clamp on to the end of a ribbon cable. Sharp metal prongs cut through the insulation of each wire and make contact with the conductor within.

Interrupt - a signal used by a peripheral device (such as a 2000 card) to signal to the computer that it requires attention.

Kickstart - Is the Amiga's Operating System including such things as multitasking and windows etc. Often used to refer to a ROM which contains the Operating System.

Link - a group of two or more adjacent pins, designed to have a small plastic-coated metal clip connected across them.

MB - Stands for Megabyte, one million bytes (8 bit words) or characters.

Mb - Stands for Megabit, one million bits, a bit is a single cell or latch which is either logic 0 (0v) or logic 1 (5v).

NTSC - This strictly refers to the method by which colour video images are encoded for transmission and storage in the USA and many other parts of the world, but when applied to a particular Amiga indicates that the video signals it produces use a 60 frames/second 200 line/frame format. Conversely, a PAL Amiga uses a 60 frame/second 256 line/frame format.

OS - Operating System.

PAL - This strictly refers to the method by which colour video images are encoded for transmission and storage in Australia and Europe, but when applied to a particular Amiga indicates that the video signals it produces use a 50 frames/second 256 line/frame format. Conversely, an NTSC Amiga uses a 60 frame/second 200 line/frame format.

PSU - Power supply unit.

PLCC - Plastic leaded chip carrier.

RAM - Random-Access Memory. memory which can be altered and read back as often as required. The bulk of the Amiga's memory is of this type. Most references to "memory" mean RAM.

Real-Time Clock - a chip which keeps time & date internally in the same fashion as a watch. The Amiga's is powered by a small battery which maintains its operation while the machine is turned off. SetClock is used to load the Amiga's system clock from this battery-backed clock.

RF Shield - a metal plate or shroud used to prevent high-frequency electromagnetic radiation from leaving a board and causing interference with other electronic equipment, particularly televisions and radios, but also Digiview and Genlocks.

ROM - Read-Only Memory. A memory chip whose contents can be read but not altered. The Amiga's Kickstart ROM is an example.

SCSI - Small Computer Systems Interface, a fast asynchronous (handshaking) protocol for the transfer of data over short distances. The SCSI standard allows multiple devices to be connected to the bus. Hard disks which communicate using the SCSI protocol are becoming increasingly popular.

SIP - Single Inline Package.

Slow RAM - Memory that is on the graphics (chip) data bus, not the 68xxx processor bus. Therefore it is slowed by the Agnus "stealing" time from the 68xxx in certain hi-res graphic modes. If it is accessible by the graphics processor it is called Chip or graphics RAM, otherwise it is just ordinary programme memory. The A501 card and the second meg of RAM on a Phoenix Board are 2 examples, they are sometimes wrongly referred to as "fast" ram as the Amiga OS is only able to distinguish 2 of the 3 types of RAM.

SERVICE GUIDELINES

Thank you for buying a Sirius Cybernetics product. In the unlikely event that your product should require service, we want you to be aware of some conditions and procedural requirements. Please read this document in its entirety before contacting us regarding a product fault or returning a product which you believe to be faulty.

Firstly, make sure you've read all of the documentation that came with the product. This will often clear up misunderstandings and assumptions you may have made. Once you are certain that the product is not performing at it should, please go through the following checklist before returning merchandise to us for repair or replacement.

1. Verify that the product is truly defective or by methodically testing it. Remove all other peripherals (hardware) or running programs (software) to produce a repeatable test environment. Apart from ensuring that the fault is not caused by something else, this will help us to re-create the fault you are experiencing.
2. Check all socketed chips. Make sure that they are fully seated and that none of their pins are bent. If you have installed chips yourself, also check that they are plugged in the right way around by comparing the notch in the chip to the similar notch in the socket. If not, replace them with new chips, since the application of power has probably destroyed them.
3. Make sure any and all jumpers are properly set; check this against the product's documentation.
4. If the product uses memory make certain the RAM chips are from a reputable supplier and that they are 120ns or faster (part number suffix - 12, -10 or -80). The use of second-hand de-soldered RAM voids your warranty.
5. Make certain that any daughterboards are properly seated on their header pins and that no header pins have been bent or missed. Make sure cards are properly seated in their bus slots. Check that all cables are firmly connected and correctly oriented (for ribbon cables, pin 1 of a connector is usually attached to the coloured wire).
6. If any case screws have been replaced make sure that they are of the correct type and are not so long as to short out any internal wiring or boards. Make sure boards are not fouling or touching each other.
7. If the product contains memory, try to test it with MemoryTest (on the supplied disk, including docs). This may not be possible for some products.
8. Check that edge connectors are clean by wiping them gently with a lint-free tissue or cotton bud dampened with alcohol or methylated spirits. If there is a choice of slots, as in the A2000, try more than one.
9. If the product connects to the A1000's expansion bus, remove any other peripherals from this bus. Some A1000s do not run reliably with more than one device on the bus. If this appears to be the problem, we may be able to modify your 1000 to rectify it - please contact us.
10. If you experience problems when trying to run certain software with a product which contains memory, bear in mind that some software (particularly games) will not run with certain memory configurations. Please contact us for further assistance.
11. If possible, test the product on another similarly-configured Amiga running the same version of Kickstart. Try to duplicate the same fault on the other machine.
12. If the item is still under warranty we should have the warranty card you returned on file. If there was no card with the product, a dated purchase receipt will suffice. Your warranty period begins

at the time of purchase, not use - if you leave a product guaranteed for one year in its packaging for a year, the warranty will expire.

- 13 VOIDED WARRANTIES: Anything which would void the warranty of your Amiga also voids the warranty of our products. This includes the removal and/or replacement components not intended for user installation, such as the Amiga's CPU and custom chips. Any other electronic or physical abuse of a product (as determined by our repair staff) will also void your warranty.
- 14 Please contact us to obtain a Return Materials Authorization number (RMA) and make certain that this number appears on the outside of the container in which you return the product. You should use the original packaging if possible. Enclose an explanation of the problem, giving as much relevant detail as possible. A returned product without an RMA number will be treated as an out-of-warranty repair. Also include your name, address and a convenient contact phone and/or fax numbers.
- 15 All customers must pay shipping charges in both directions. All returns, including those normally covered by warranty, are subject to a \$25 inspection fee if found to be in complete working order. All products are normally returned to you C.O.D. by Australia Post.

If you have any questions regarding these conditions, please write to us, fax us on +618-265 5119 or call between 10am and 6pm Australian Central Standard Time, Monday to Friday on +618-265 5119 (overseas) or 08-265 5119 (within Australia). For the fastest service indicate clearly that you have a technical problem or question and wish to speak to the Customer Support Staff concerned with that product.

We try to perform repairs (particularly warranty repairs) as quickly as possible, but we ask that you allow up to four weeks for a repaired product to be returned to you.

SIRIUS CYBERNETICS, PO Box 360, Ingle Farm, South Australia, 5098.

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Shane DeCean - Production

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Adrian Jones - Marketing Manager

Phil Kaunesis - Stores/Maintenance

Antony King - Purchasing Officer

Tina Patterson - Personal Assistant

Margaret Porter - Company Secretary

Jonathan Potter - Programmer and Fellow Phoenix Concept Originator

Helen Safralidis - Production Manager?

Dr Michael Snow M.S.c., Ph.D., FRACI - Chairman and Financier

Sam Snow - Accounting/Sales

Jess Snow - General Hand

Myrna Stoddard - Production

Michael Warner - Design Engineer